#### OXYBUTYNIN CHLORIDE - oxybutynin chloride tablet, film coated, extended release

Physicians Total Care, Inc.

#### DESCRIPTION

Oxybutynin chloride is an antispasmodic, anticholinergic agent. Each oxybutynin chloride extended-release tablet, USP contains 5 mg or 10 mg of oxybutynin chloride USP, formulated as a once-a-day controlled-release tablet for oral administration. Oxybutynin chloride is administered as a racemate of R- and S- enantiomers.

Chemically, oxybutynin chloride is d,l (racemic) 4-diethylamino-2-butynyl phenyl-cyclohexylglycolate hydrochloride. The molecular formula of oxybutynin chloride is C<sub>22</sub>H<sub>31</sub>NO<sub>3</sub> • HCl.

Its structural formula is:

Oxybutynin chloride is a white crystalline solid with a molecular weight of 393.9. It is readily soluble in water and acids, but relatively insoluble in alkalis.

Oxybutynin chloride extended-release tablets contain the following inactive ingredients: colloidal silicon dioxide, dibasic calcium phosphate (anhydrous), hypromellose, magnesium stearate, methacrylic acid copolymer dispersion, polydextrose, polyethylene glycol, polysorbate 80, povidone, sodium hydroxide, talc, titanium dioxide, triacetin and triethyl citrate. The 5 mg strength also contains D&C Yellow No. 10 Aluminum Lake, FD&C Blue No. 1 Aluminum Lake and FD&C Red No. 40 Aluminum Lake; and the 10 mg strength also contains D&C Yellow No. 6 Aluminum Lake.

In addition, oxybutynin extended-release tablets may also contain imprinting ink consisting of either black pigment and natural resin or black iron oxide and propylene glycol.

Meets USP Dissolution Test 2.

System Components and Performance

Oxybutynin chloride extended-release tablets are formulated to deliver oxybutynin chloride at a controlled rate over approximately 24 hours. The dosage form is comprised of a hydrophilic cellulose polymer matrix tablet surrounded by an enteric coating system. The enteric coat is insoluble in the low pH environment of the stomach. As the tablet passes through the stomach and enters the higher pH environment of the small intestine, the enteric coating dissolves and/or erodes to expose the polymer matrix tablet which swells and releases drug at a controlled rate via diffusion and/or erosion.

## CLINICAL PHARMACOLOGY

Oxybutynin chloride exerts a direct antispasmodic effect on smooth muscle and inhibits the muscarinic action of acetylcholine on smooth muscle. Oxybutynin chloride exhibits only one-fifth of the anticholinergic activity of atropine on the rabbit detrusor muscle, but four to ten times the antispasmodic activity. No blocking effects occur at skeletal neuromuscular junctions or autonomic ganglia (antinicotinic effects).

Oxybutynin chloride relaxes bladder smooth muscle. In patients with conditions characterized by involuntary bladder contractions, cystometric studies have demonstrated that oxybutynin increases bladder (vesical) capacity, diminishes the frequency of uninhibited contractions of the detrusor muscle, and delays the initial desire to void. Oxybutynin thus decreases urgency and the frequency of both incontinent episodes and voluntary urination.

Antimuscarinic activity resides predominantly in the R-isomer. A metabolite, desethyloxybutynin, has pharmacological activity similar to that of oxybutynin in *in vitro* studies.

PharmacokineticsAbsorption

Following the first dose of oxybutynin chloride extended-release tablets, oxybutynin plasma concentrations rise for 4 to 6 hours; thereafter steady concentrations are maintained for up to 24 hours, minimizing fluctuations between peak and trough concentrations associated with oxybutynin.

The relative bioavailabilities of R- and S-oxybutynin from oxybutynin chloride extended-release are 156% and 187%, respectively, compared with oxybutynin. The mean pharmacokinetic parameters for R- and S-oxybutynin are summarized in Table 1. The plasma concentration-time profiles for R- and S-oxybutynin are similar in shape; Figure 1 shows the profile for R-oxybutynin.

Table 1 Mean (SD) R- and S- Oxybutynin Pharmacokinetic Parameters Following a Single Dose of Oxybutynin Chloride Extended-release Tablets 10 mg (n = 43)

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Parameters (units)	R-Oxybutynin	S-Oxybutynin		
C <sub>max</sub> (ng/mL)	1	(0.6)	1.8	(1)
$T_{max}(h)$	12.7	(5.4)	11.8	(5.3)
$t_{1/2}(h)$	13.2	(6.2)	12.4	(6.1)
$AUC_{(0-48)}$ (ng•h/mL)	18.4	(10.3)	34.2	(16.9)
AUC <sub>inf</sub> (ng•h/mL)	21.3	(12.2)	39.5	(21.2)

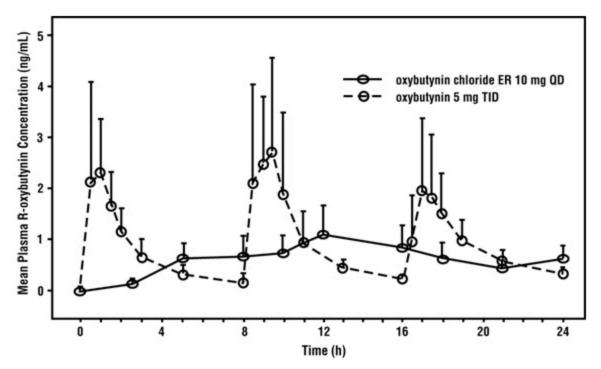


Figure 1. Mean R-oxybutynin plasma concentrations following a single dose of oxybutynin chloride ER 10 mg and oxybutynin 5 mg administered every 8 hours (n = 23 for each treatment).

Steady-state oxybutynin plasma concentrations are achieved by Day 3 of repeated oxybutynin chloride extended-release dosing, with no observed drug accumulation or change in oxybutynin and desethyloxybutynin pharmacokinetic parameters.

Pharmacokinetic information for pediatric patients 5 to 15 years of age with symptoms of detrusor overactivity associated with a neurological condition (e.g., spina bifida) is approved for Alza Corporation's oxybutynin chloride extended-release tablets. However, due to Alza Corporation's marketing exclusivity rights, this drug product is not labeled for pediatric use.

### Food Effects

The rate and extent of absorption and metabolism of oxybutynin are similar under fed and fasted conditions.

### Distribution

Plasma concentrations of oxybutynin decline biexponentially following intravenous or oral administration. The volume of distribution is 193 L after intravenous administration of 5 mg oxybutynin chloride.

### Metabolism

Oxybutynin is metabolized primarily by the cytochrome P450 enzyme systems, particularly CYP3A4 found mostly in the liver and gut wall. Its metabolic products include phenylcyclohexylglycolic acid, which is pharmacologically inactive, and desethyloxybutynin, which is pharmacologically active. Following oxybutynin chloride extended-release administration, plasma concentrations of R- and S-desethyloxybutynin are 73% and 92%, respectively, of concentrations observed with oxybutynin.

#### Excretion

Oxybutynin is extensively metabolized by the liver, with less than 0.1% of the administered dose excreted unchanged in the urine. Also, less than 0.1% of the administered dose is excreted as the metabolite desethyloxybutynin.

### Dose Proportionality

Pharmacokinetic parameters of oxybutynin and desethyloxybutynin ( $C_{max}$  and AUC) following administration of 5 mg to 20 mg of oxybutynin chloride extended-release tablets are dose proportional.

# Special PopulationsGeriatric

The pharmacokinetics of oxybutynin chloride extended-release were similar in all patients studied (up to 78 years of age). Pediatric

Pharmacokinetic information for pediatric patients 5 to 15 years of age with symptoms of detrusor overactivity associated with a neurological condition (e.g., spina bifida) is approved for Alza Corporation's oxybutynin chloride extended-release tablets. However, due to Alza Corporation's marketing exclusivity rights, this drug product is not labeled for pediatric use.

#### Gender

There are no significant differences in the pharmacokinetics of oxybutynin in healthy male and female volunteers following administration of oxybutynin chloride extended-release.

### Race

Available data suggest that there are no significant differences in the pharmacokinetics of oxybutynin based on race in healthy volunteers following administration of oxybutynin chloride extended-release.

Renal Insufficiency

There is no experience with the use of oxybutynin chloride extended-release in patients with renal insufficiency.

Hepatic Insufficiency

There is no experience with the use of oxybutynin chloride extended-release in patients with hepatic insufficiency.

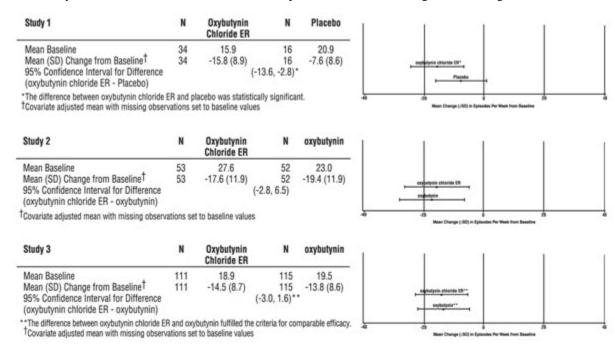
**Drug-Drug Interactions** 

See PRECAUTIONS: Drug Interactions.

Clinical Studies

Oxybutynin chloride extended-release was evaluated for the treatment of patients with overactive bladder with symptoms of urge urinary incontinence, urgency, and frequency in three controlled studies and one open label study. The majority of patients were Caucasian (89%) and female (91.9%) with a mean age of 59 years (range, 18 to 98 years). Entry criteria required that patients have urge or mixed incontinence (with a predominance of urge) as evidenced by  $\geq 6$  urge incontinence episodes per week and  $\geq 10$  micturitions per day. Study 1 was a fixed dose escalation design, whereas the other studies used a dose adjustment design in which each patient's final dose was adjusted to a balance between improvement of incontinence symptoms and tolerability of side effects. Controlled studies included patients known to be responsive to oxybutynin or other anticholinergic medications, and these patients were maintained on a final dose for up to 2 weeks.

The efficacy results for the three controlled trials are presented in the following tables and figures.



### INDICATIONS AND USAGE

Oxybutynin chloride extended-release tablets are once daily controlled-release tablets indicated for the treatment of overactive bladder with symptoms of urge urinary incontinence, urgency, and frequency.

Pediatric use information for the treatment of patients aged 6 years and older with symptoms of detrusor overactivity associated with a neurological condition (e.g., spina bifida) is approved for Alza Corporation's oxybutynin extended-release tablets. However, due to Alza Corporation's marketing exclusivity rights, this drug product is not labeled for pediatric use.

# CONTRAINDICATIONS

Oxybutynin chloride extended-release tablets are contraindicated in patients with urinary retention, gastric retention and other severe decreased gastrointestinal motility conditions, uncontrolled narrow angle glaucoma and in patients who are at risk for these conditions. Oxybutynin chloride extended-release is also contraindicated in patients who have demonstrated hypersensitivity to the drug substance or other components of the product.

### **PRECAUTIONS**

Central Nervous System Effects

Oxybutynin is associated with anticholinergic central nervous system (CNS) effects (see ADVERSE REACTIONS). A variety of CNS anticholinergic effects have been reported, including hallucinations, agitation, confusion and somnolence. Patients should be monitored for signs of anticholinergic CNS effects, particularly in the first few months after beginning treatment or increasing the dose. If a patient experiences anticholinergic CNS effects, dose reduction or drug discontinuation should be considered. Oxybutynin chloride extended-release should be used with caution in patients with preexisting dementia treated with cholinesterase inhibitors due to the risk of aggravation of symptoms.

#### General

Oxybutynin chloride extended-release should be used with caution in patients with hepatic or renal impairment and in patients with myasthenia gravis due to the risk of symptom aggravation.

### **Urinary Retention**

Oxybutynin chloride extended-release should be administered with caution to patients with clinically significant bladder outflow obstruction because of the risk of urinary retention (see CONTRAINDICATIONS).

#### Gastrointestinal Disorders

Oxybutynin chloride extended-release should be administered with caution to patients with gastrointestinal obstructive disorders because of the risk of gastric retention (see CONTRAINDICATIONS).

Oxybutynin chloride extended-release, like other anticholinergic drugs, may decrease gastrointestinal motility and should be used with caution in patients with conditions such as ulcerative colitis and intestinal atony.

Oxybutynin chloride extended-release should be used with caution in patients who have gastroesophageal reflux and/or who are concurrently taking drugs (such as bisphosphonates) that can cause or exacerbate esophagitis.

As with any other nondeformable material, caution should be used when administering oxybutynin chloride extended-release to patients with preexisting severe gastrointestinal narrowing (pathologic or iatrogenic). There have been rare reports of obstructive symptoms in patients with known strictures in association with the ingestion of other drugs in nondeformable controlled-release formulations.

#### **Information for Patients**

Patients should be informed that heat prostration (fever and heat stroke due to decreased sweating) can occur when anticholinergics such as oxybutynin chloride are administered in the presence of high environmental temperature.

Because anticholinergic agents such as oxybutynin may produce drowsiness (somnolence) or blurred vision, patients should be advised to exercise caution.

Patients should be informed that alcohol may enhance the drowsiness caused by anticholinergic agents such as oxybutynin.

Patients should be informed that oxybutynin chloride extended-release tablets should be swallowed whole with the aid of liquids.

Patients should not chew, divide, or crush tablets.

Oxybutynin chloride extended-release tablets should be taken at approximately the same time each day.

#### **Drug Interactions**

The concomitant use of oxybutynin with other anticholinergic drugs or with other agents which produce dry mouth, constipation, somnolence (drowsiness), and/or other anticholinergic-like effects may increase the frequency and/or severity of such effects.

Anticholinergic agents may potentially alter the absorption of some concomitantly administered drugs due to anticholinergic effects on gastrointestinal motility. This may be of concern for drugs with a narrow therapeutic index.

Mean oxybutynin chloride plasma concentrations were approximately 2-fold higher when oxybutynin chloride extended-release tablets were administered with ketoconazole, a potent CYP3A4 inhibitor. Other inhibitors of the cytochrome P450 3A4 enzyme system, such as antimycotic agents (e.g., itraconazole and miconazole) or macrolide antibiotics (e.g., erythromycin and clarithromycin), may alter oxybutynin mean pharmacokinetic parameters (i.e.,  $C_{max}$  and AUC). The clinical relevance of such potential interactions is not known. Caution should be used when such drugs are coadministered.

Carcinogenesis, Mutagenesis, Impairment of Fertility

A 24 month study in rats at dosages of oxybutynin chloride of 20, 80 and 160 mg/kg/day showed no evidence of carcinogenicity. These doses are approximately 6, 25 and 50 times the maximum human exposure, based on surface area.

Oxybutynin chloride showed no increase of mutagenic activity when tested in *Schizosaccharomyces pompholiciformis*, *Saccharomyces cerevisiae*, and *Salmonella typhimurium* test systems.

Reproduction studies with oxybutynin chloride in the mouse, rat, hamster, and rabbit showed no definite evidence of impaired fertility. Pregnancy Teratogenic Effects, Pregnancy Category B

Reproduction studies with oxybutynin chloride in the mouse, rat, hamster, and rabbit showed no definite evidence of impaired fertility or harm to the animal fetus. The safety of oxybutynin chloride extended-release administration to women who are or who may become pregnant has not been established. Therefore, oxybutynin chloride extended-release should not be given to pregnant women unless, in the judgment of the physician, the probable clinical benefits outweigh the possible hazards.

### **Nursing Mothers**

It is not known whether oxybutynin is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when oxybutynin chloride extended-release is administered to a nursing woman.

### Pediatric Use

Clinical study information for pediatric patients 6 to 15 years of age with symptoms of detrusor overactivity in association with a neurological condition (e.g., spina bifida) is approved for Alza Corporation's oxybutynin chloride extended-release tablets. However, due to Alza Corporation's marketing exclusivity rights, this drug product is not labeled for pediatric use.

Oxybutynin chloride extended-release tablets are not recommended in pediatric patients who cannot swallow the tablet whole without chewing, dividing or crushing, or in children under the age of 6 years.

## Geriatric Use

The rate and severity of anticholinergic effects reported by patients less than 65 years old and those 65 years and older were similar (see CLINICAL PHARMACOLOGY: Pharmacokinetics: Special Populations: Geriatric).

#### ADVERSE REACTIONS

Adverse Events with Oxybutynin Chloride Extended-release Tablets

The safety and efficacy of oxybutynin chloride was evaluated in a total of 580 participants who received oxybutynin chloride extended-release tablets in four clinical trials (429 patients) and four pharmacokinetic studies (151 healthy volunteers). The 429 patients were treated with 5 to 30 mg/day for up to 4.5 months. Three of the four clinical trials allowed dose adjustments based on efficacy and adverse events and one was a fixed dose escalation design. Safety information is provided for 429 patients from these three controlled clinical studies and one open label study in the first column of Table 2 below.

Adverse events from two additional fixed dose, active controlled, 12 week treatment duration, post-marketing studies, in which 576 patients were treated with oxybutynin chloride extended-release tablets 10 mg/day, are also listed in Table 2 (second column). The adverse events are reported regardless of causality.

Table 2 Incidence (%) of Adverse Events Reported by  $\geq$  5% of Patients Using Oxybutynin Chloride Extended-release Tablets (5 to 30 mg/day) and % of Corresponding Adverse Events in Two Fixed Dose (10 mg/day) Studies

Body System	Adverse Event	Oxybutynin Chloride ER Tablets 5 to 30 mg/day (n = 429)	Oxybutynin Chloride ER Tablets 10 mg/day (n = 576)
General	headache	10	6
	asthenia	7	3
	pain	7	4
Digestive	dry mouth	61	29
	constipation	13	7
	diarrhea	9	7
	nausea	9	2
	dyspepsia	7	5
Nervous	somnolence	12	2
	dizziness	6	4
Respiratory	rhinitis	6	2
Special senses	blurred vision	8	1
	dry eyes	6	3
Urogenital	urinary tract infection	5	5

The most common adverse events reported by the 429 patients receiving 5 to 30 mg/day oxybutynin chloride extended-release tablets were the expected side effects of anticholinergic agents. The incidence of dry mouth was dose related.

The discontinuation rate for all adverse events was 6.8% in the 429 patients from the four studies of efficacy and safety who received 5 to 30 mg/day. The most frequent adverse event causing early discontinuation of study medication was nausea (1.9%), while discontinuation due to dry mouth was 1.2%.

In addition, the following adverse events were reported by greater than or equal to 1 to less than 5% of all patients who received oxybutynin chloride extended-release tablets in the six adjustable and fixed dose efficacy and safety studies. *Infections and Infestations:* nasopharyngitis, upper respiratory tract infection, sinusitis, bronchitis, cystitis; *Psychiatric Disorders:* insomnia, depression, nervousness, confusional state; *Nervous System Disorders:* dysgeusia; *Cardiac Disorders:* palpitations; *Vascular Disorders:* hypertension; *Respiratory, Thoracic and Mediastinal Disorders:* nasal dryness, cough, pharyngolaryngeal pain, dry throat; *Gastrointestinal Disorders:* gastroesophageal reflux disease, abdominal pain, loose stools, flatulence, vomiting; *Skin and Subcutaneous Tissue Disorders:* dry skin, pruritis; *Musculoskeletal and Connective Tissue Disorders:* back pain, arthralgia, pain in extremity; *Renal and Urinary Disorders:* urinary retention, urinary hesitation, dysuria; *General Disorders and Administration Site Conditions:* fatigue, edema peripheral, asthenia, chest pain; *Investigations:* blood pressure increased.

# Post-Marketing Surveillance

Because post-marketing reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure. The following additional adverse drug reactions have been reported from worldwide post-marketing experience with oxybutynin chloride extended-release tablets: *Psychiatric Disorders:* psychotic disorder, agitation, hallucinations; *Nervous System Disorders:* convulsions; *Cardiac Disorders:* arrhythmia; tachycardia; *Vascular Disorders:* flushing; *Skin and Subcutaneous Tissue Disorders:* rash; *Renal and Urinary Disorders:* impotence; *Injury, Poisoning and Procedural Complications:* fall.

Additional adverse events reported with some other oxybutynin chloride formulations include: cycloplegia, mydriasis, and suppression of lactation.

#### **OVERDOSAGE**

The continuous release of oxybutynin from oxybutynin chloride extended-release tablets should be considered in the treatment of overdosage. Patients should be monitored for at least 24 hours. Treatment should be symptomatic and supportive. Activated charcoal as well as a cathartic may be administered.

Overdosage with oxybutynin chloride has been associated with anticholinergic effects including central nervous system excitation, flushing, fever, dehydration, cardiac arrhythmia, vomiting, and urinary retention.

Ingestion of 100 mg oxybutynin chloride in association with alcohol has been reported in a 13 year old boy who experienced memory loss, and a 34 year old woman who developed stupor, followed by disorientation and agitation on awakening, dilated pupils, dry skin, cardiac arrhythmia, and retention of urine. Both patients fully recovered with symptomatic treatment.

### DOSAGE AND ADMINISTRATION

Oxybutynin chloride extended-release tablets must be swallowed whole with the aid of liquids, and must not be chewed, divided, or crushed.

Oxybutynin chloride extended-release tablets may be administered with or without food.

Adults

The recommended starting dose of oxybutynin chloride extended-release tablets is 5 mg or 10 mg once daily at approximately the same time each day. Dosage may be adjusted in 5 mg increments to achieve a balance of efficacy and tolerability (up to a maximum of 30 mg/day). In general, dosage adjustment may proceed at approximately weekly intervals.

**Pediatric Patients** 

Dosing information for pediatric patients aged 6 years and older is approved for Alza Corporation's oxybutynin chloride extended-release tablets. However, due to Alza Corporation's marketing exclusivity rights, this drug product is not labeled for pediatric use.

#### HOW SUPPLIED

Oxybutynin chloride extended-release tablets, USP are available containing 5 mg or 10 mg of oxybutynin chloride, USP.

The 5 mg tablets are light green film coated, round, unscored tablets with **M** over **O 5** imprinted in black ink on one side of the tablet and blank on the other side. They are available as follows:

NDC 54868-5742-0,

bottles of 10 tablets

NDC 54868-5742-1

bottles of 30 tablets

NDC 54868-5742-2

bottles of 60 tablets

NDC 54868-5742-3

bottles of 90 tablets

The 10 mg tablets are peach film coated, round, unscored tablets with **M** over **O** 10 imprinted in black ink on one side of the tablet and blank on the other side. They are available as follows:

NDC 54868-5728-0

bottles of 10 tablets

NDC 54868-5728-1

bottles of 30 tablets

### Store at 20° to 25°C (68° to 77°F). [See USP for Controlled Room Temperature.]

### Protect from moisture and humidity.

Dispense in a tight, light-resistant container as defined in the USP using a child-resistant closure.

Mylan Pharmaceuticals Inc.

Morgantown, WV 26505

**REVISED JANUARY 2009** 

OXBN:R2

#### PRINCIPAL DISPLAY PANEL

Oxybutynin chloride extended-release tablets, USP

5 mg



# 10mg

